AWIPS SYSTEM ADMINISTRATION NOTE 12 (for Electronic Systems Analysts)
Maintenance, Logistics, and Acquisition Division
W/OPS1: JCS

SUBJECT : LDAD Backup/Restore Procedures.

PURPOSE : To provide instructions on manual backup and restore procedures for the LDAD disk system.

AFFECTED SITES: All AWIPS sites.

VERIFICATION STATEMENT : These procedures were verified at the Silver Spring, MD (SVLM2) NMTR's LDAD Server.

TIME REQUIRED : Approximately 2 hours

SECURITY LEVEL: root

TECHNICAL SUPPORT : For questions or problems regarding these procedures, please contact the NCF at 301-713-9344**.**

BACKGROUND

These LDAD tape backup/restore procedures provide instructions to manually create an LDAD disk system backup and restore. The backup tapes can be used to restore the LDAD server. The restore procedure enables the LDAD server to boot from the backup tape. The tape then continues to restore the entire disk system including partition sizes. It is important to verify the LDAD server with the site localization before returning to operational status.

This procedure assumes the following:

- LDAD server is connected to the site's network
- The site to be up and operational
- A backup tape exists from either a previously performed backup or having another site's LDAD server to create backup disks.

An LDAD server disk replacement may apply to either the root disk mounted on vg00 and containing the operating system and COTS software, or the secondary disk mounted on vg01 and containing AWIPS applications. Perform the following procedures to recover either disks.

NOTE: Sites are required to perform this procedure after software upgrades or other major changes to the LDAD server.

PROCEDURE

I. LDAD Backup Procedure

The `make_recovery` utility backs up the primary hard drive, volume group 0 (vg00), and creates a self-restoring bootable tape. The tape created by the `make_recovery` utility automatically performs the following actions:

- Boots the LDAD server.
- Reconfigures the primary hard drive, vg00, with the correct partition sizes.
- Restores all the data/files/directories from the tape to the primary hard drive, vg00.

NOTE: 1. Before continuing with the procedures in section A, login to the site to verify that the site is correct and determine these problems exist:
   a. LDAD server must be unable to boot (if recovering a root disk), and
   b. the disk has been replaced.

2. The secondary hard drive, volume group 1 (vg01), is backed up using the `tar` utility. To proceed with the backup for both volume groups, perform the following procedures on a baselined, working LDAD server. This backup must be performed after every upgrade and both disks (vg00 and vg01) must be backed up.

A. Make_recovery Primary Disk (vg00) Backup Procedure

1. Insert a blank tape with write protect off into the ls1 DAT drive.
2. At a workstation, open a telnet session, log into ds1 as `root` and remote log into ls1 by typing:

   `rlogin ls1`

3. Initiate the tape creation. The LDAD server may be operational during the tape creation process. Verify the tape drive is connected and is using `/dev/rmt/0m` by typing:

   `ioscan -fn|egrep "tape|rmt"`

   A sample output follows:

```
tape    0  8/16/5.0.0  stape   CLAIMED  DEVICE    HP    C1533A (or 37A)
                        /dev/rmt/0m      /dev/rmt/c3t0d0BEST
                        /dev/rmt/0mb     /dev/rmt/c3t0d0BESTb
                        /dev/rmt/0mn     /dev/rmt/c3t0d0BESTn
                        /dev/rmt/0mnb    /dev/rmt/c3t0d0BESTnb
```

NOTE: 1. If the device files `/dev/rmt/0m*` are not present, the SCSI settings on the DAT drive do not match the files or the files do not exist. **Do not** proceed. Call the NCF.

4. Edit the `inittab` file as shown below. This will restore LDAD to single user when `make_recovery` is used.

   `vi /etc/inittab`

   Change this line:

   ```
   init:3:initdefault:
   ```

   to:

   `init:S:initdefault:`

5. Before starting the tape creation, verify the following listing contains only two files (listed below). The remaining part of the `/etc/rc.config.d` directory **should not be touched.** Any other files need to be deleted before making the tape.

   `ls /etc/rc.config.d/netconf* /etc/rc.config.d/netconf`

   `ls /etc/rc.config.d/netdaemons* /etc/rc.config.d/netdaemons`

6. Initiate the `make_recovery` process (this takes approximately 20-30 minutes) by typing:

   `/opt/ignite/bin/make_recovery -A`

   a. The following message displays:

   ```
   Option -A specifies backup of entire Core Volume Group/disk.

   ************************************
   HP-UX System Recovery
   Going to create the tape.
   System Recovery Tape successfully created.
   ```

   b. A prompt appears once the `make_recovery` is complete.

7. After turning write protect on, verify the vg00 backup tape contents by typing:

   ```
   mt -t /dev/rmt/0mn fsf 1
   nohup tar -tf /dev/rmt/0m > /tmp/nohup.out 2>&1 &
   tail -f /tmp/nohup.out
   ```

NOTE: 2. The use of `nohup` is to ensure the operation will continue running in the background if the terminal session that initiated the command is closed or is in some way terminated. Although it is not required, it is highly recommended.

8. Ensure no errors are displayed and a complete directory of the backup files is listed ending with entries under `/var`.

9. Annotate the device/site ID, root password, release number (to find the release number, type **`cat /ldad/Release_ID`**), and date on the backup date. If multiple tapes were used, indicate the tape sequence on the label.

   The label should include:

   Make_recovery for ***ls1-xxx*** Software Release: ***X.X.X***
   root password: ***xxxxxx*** Date Created: ***mm/dd/yyyy***

10. Restore the previous `inittab` file changes from step 4 by typing:

    `vi /etc/inittab`

    Change line:

    `init:S:initdefault:`

    to:

    `init:3:initdefault:`

This completes the `make_recovery` backup procedure.

B. Secondary Disk (vg01) Backup Procedure

1. Backup the vg01 partitions using `tar` (only `/data/ldad` and `/home` need to be backed up). Insert a new tape with write protect turned off into the internal DAT drive and type:

   `nohup tar c /data/ldad /home > /tmp/nohup.out 2>&1 &`

   a. Monitor the `tar` process by typing the commands below. The `tar c` displays as a process until it completes. Press ^C to interrupt the loop and continue with the verification (this process will take 90 - 120 minutes).

   ```
   while true
   do
   ps -ef|grep "tar c"
   date
   sleep 10
   done
   ```

   b. Verify the `nohup.out` log file does not display read/write errors by typing:

   `cat /tmp/nohup.out`

NOTE: If read/write errors are encountered, **do not** proceed with the next step. Call the NCF. Errors indicating unknown userid or group numbers can be ignored.

2. Turn write protect on and verify the vg01 backup tape contents by typing:

   `nohup tar -tf /dev/rmt/0m > /tmp/nohup.out 2>&1 &`

   `tail -f /tmp/nohup.out`

3. Ensure no errors are displayed and a complete directory of backup files are displayed ending with entries under `/home`.

4. Annotate the device/site ID, release number, and date on the backup tape. If multiple tapes were used, indicate the tape sequence on the label.

   The label should include:

   Tar formatted tape of vg01 disk for **ls1-*xxx***
   Software Release: ***X.X.X*** Date Created: ***mm/dd/yyyy***

This completes the secondary disk (vg01) backup procedure.

II. LDAD Restoration Procedure

From the Xyplex console, restore the primary and secondary volume groups from the `make_recovery` and `tar`'ed tape respectively. Perform the following procedures:

A. Primary Disk (vg00) Restoration Procedure

1. This restoration procedure is used to rebuild the vg00 drive after replacing a hard drive. Insert a previously made `make_recovery` tape with write protect on, into the DAT drive.
2. Reboot the device or turn it on by typing:

   `/etc/reboot`

NOTE: 1. If during this process the Xyplex console logs out, reconnect or resume the session.

3. Press the space bar to interrupt the boot process and perform a search. The search will look similar to the following example:

   `Main Menu: Enter command > sea`

   The following message displays:

```
Searching for potential boot device(s)...
This may take several minutes.

To discontinue search, press any key (termination may not be
immediate).

Path Number    Device Path (dec)    Device Type
-----------    -----------------    -----------
P0             8/12.5               Random access media
P1             8/12.12              Random access media
P2             8/16/5.2             Random access media
P3             8/16/5.0             Sequential access media
P4             8/16/6.0             LAN Module
```

4. Select the DAT (Sequential access media) as the boot device, and reboot using the `make_recovery` tape:

   `Main Menu: Enter command or menu > bo px` (where ***x*** is the DAT P#)
   `Interact with IPL (Y or N?)> n`

NOTE: 2. If the `make_recovery` asks to restore to a disk other than `scsi_5`, reply **no** and call the NCF.

5. The restore will take approximately 1-2 hours. Once the root disk reinstallation is complete, the LDAD server will reboot to single user.

NOTE: 3. If an error occurs during the restoration process, clean the DAT drive heads and repeat the `make_recovery` restore procedure. If the error persists, it may be necessary to acquire a `make_recovery` tape from another site.

6. Reconfigure the reinstalled system by typing the commands below. The system will reboot in single user mode to allow updates to vg01.

```
/sbin/insf -e -C disk
rm -f /dev/rmt/[0-9]*m*
/sbin/insf -e -C tape
/sbin/lvmrc
/sbin/mountall -l -m
/configure3
```
(after running configure3 the ls1 will reboot)

7. Edit the `inittab` file as shown below. This will restore LDAD to single user and correct identity when the LDAD server is rebooted.

NOTE: 4. The system console break-key is located where the escape key is normally located.

Type:

```
vi /etc/inittab
```

Change this line:

```
init:S:initdefault:
```

to:

```
init:1:initdefault:
```

```
export TERM/hp
mount -a
```

NOTE: 5. Change the netdaemon file in step 8 even if the site's own tape is used.

8. Edit the `netdaemon` file. The example below is taken from the Caribou, ME (CAR) LDAD.

   `vi /etc/rc.config.d/netdaemons`

   Change this line:

   `export NTPDATE_SERVER=-b gw-`**`car`** `#`

   to:

   `export NTPDATE_SERVER="-b gw-`*`xxx`*`"` # (where ***`xxx`*** is the site ID)

9. Save the changes by typing:

   `wq!`

NOTE: 6. If it is necessary to reboot to level 1 to verify the edited files, proceed to the boot menu shown in step 4 (Do not use a P#. It may be necessary to cycle the power on the LDAD server). Select **Y** when asked to interact with IPL. At the ISL prompt type the following to enter level 1:

   `ISL>` **`hpux -il`**

7. If the restoration tape is from another site's LDAD, perform the localization steps 10 through 12. Otherwise skip to step 13. Site specific changes, identified by ***`bold italicized`*** text, should be the only text changed to reflect local site characteristics. **Do not** change the files below if the tape is from the local site. Steps 10 through 12 are examples from the Caribou, ME (CAR) LDAD.

10. In the event the `make_recovery` tape is obtained from another site, the following files must be updated to reflect the correct name and IP address of the LDAD server being restored.

/etc/gettydefs

```
#(ls1-car) Console Login: #console
```

/etc/hosts

```
205.156.27.60  ls1-car ls1 ls
205.156.27.65  ldadhub-car ldadhub # ldad rack wave switch
205.156.27.66  gw-car gw firewall-car firewall # ldad firewall
205.156.27.69  ltserv-car ltserv # ldad rack xyplex terminal server
205.156.27.70  7e1out
205.156.27.71  8n1out
205.156.27.4   car-router
```

NOTE: 8. All site specific changes are not tracked in this note. Only the required elements are shown. Maintain a record of all site specific changes to restore the system to its original functionality.

11. Complete the required changes below.

/etc/rc.config.d/netconf

```
HOSTNAME=ls1-car
IP_ADDRESS[0]=205.156.27.60
SUBNET_MASK[0]="255.255.255.0"
BROADCAST_ADDRESS[0]=""
ROUTE_GATEWAY[0]=205.156.27.4
```

Remove the "#" signs to uncomment the following section:

```
# ROUTE_DESTINATION[1]="net 165.92"
# ROUTE_MASK[1]="255.255.0.0"
# ROUTE_GATEWAY[1]=205.156.27.66
# ROUTE_COUNT[1]="1"
# ROUTE_ARGS[1]=""
```

The section should look like this after it has been uncommented:

```
ROUTE_DESTINATION[1]="net 165.92"
ROUTE_MASK[1]="255.255.0.0"
ROUTE_GATEWAY[1]=205.156.27.66
ROUTE_COUNT[1]="1"
ROUTE_ARGS[1]=""
```

12. Type:

    /etc/ntp.conf

    server ***205.156.27.66*** prefer

13. Continue with the required changes. Type:

    /var/adm/inetd.sec

    dtspc allow 127.0.0.1 ls1-***car***
    spc allow 127.0.0.1 ls1-***car***
    mserve allow 127.0.0.1 ls1-***car***

14. Check the following files and replace the ***bold, italicized*** text with site specific information.

    /opt/ns-ftrack/admin-serv/config/ns-admin.conf

    ServerName ls1-***car***
    Addresses ***205.156.27.60***

    /opt/ns-ftrack/httpd-default/conf_bk/magnus.conf

    ServerName ls1-***car***

    /opt/ns-ftrack/httpd-default/conf_bk/magnus.conf.1

    ServerName ls1-***car***

    /opt/ns-ftrack/httpd-default/config/magnus.conf

    ServerName ls1-***car***

    /opt/ns-ftrack/newconfig/opt/ns-ftrack/admin-serv/config/ns-admin.conf

    ServerName ls1-***car***
    Addresses ***205.156.27.60***

    /opt/ns-ftrack/newconfig/opt/ns-ftrack/httpd-default/config/magnus.conf

    ServerName ls1-***car***

NOTE: 9. The root password must be the same as the one used when the disk image was created. If the disk image is from another site, the password must be changed to match the one used at the local site.

15. The Netscape administrator's encrypted password will have to be updated before the disk image is restored. Copy the first two fields from the current `/etc/passwd` file for root and place it in the following file (example from CAR):

    `/opt/ns-ftrack/admin-serv/config/admpw`

    `root:`**`r2p4n.D4gY1Jw`**

    `/.rhosts`

    `gw-`***`car`*** `root`

    `/etc/hosts.equiv`

    `gw-`***`car`***
    `ls1-`***`car`***
    `ds1-`***`car`***
    `ds1-`***`car`***
    `ds2-`***`car`***
    `as1-`***`car`***
    `as2-`***`car`***

16. Check the following files for site related changes:

    `/etc/fstab`
    `/etc/resolv.conf`

17. It may be necessary to change to the root password. To ensure vg01 mounts, reboot LDAD by typing:

    `/etc/reboot`

18. If vg01 is present on the device being restored, determine if the volume group is available. Mount all the partitions by typing:

    `mount –a`

19. If vg01 mounts, continue with Step 19. If vg01 is not available, continue with the next step.

    a. Before the `vgexport` of vg01 can take place, unmount all logical volumes. In most cases, vg01 will not have any mounted partitions. Use `bdf` and `swapinfo` to verify if any of the vg01 partitions are mounted. If they are, `umount` the logical volumes prior to doing the `vgexport`. If `/dev/vg01/lvol1` is in use for swap space, edit `/etc/fstab` to comment the entry (use # as first character), and reboot the LDAD server. After the export is complete, remove the # in the `fstab` file.

b. Perform steps (i), (ii), or (iii) if the disk still fails to mount.

NOTE: 10. If the disk requires a complete restoration, follow the procedure in section II, part B, *Secondary Disk (vg01) Restoration Procedure*.

(i) If the vg01 references are removed, and if the vg01 disk is in working order, recreate a new vg01 by typing:

```
vgexport vg01
mkdir /dev/vg01
cd /dev/vg01
mknod group c 64 0x010000
chmod 640 group
vgimport vg01 /dev/dsk/c0t12d0
vgchange -a y vg01
swapon -f /dev/vg01/lvol1
vgcfgbackup vg01
mount -a
```

(ii) If the logical volumes do not mount, the disk may be corrupt. Type the following for each failed logical volume:

```
fsck -F vxfs -o full /dev/vg01/lvol#
```

(iii) After a successful file system integrity check, type the following to verify all logical volumes (`lvols`) mount successfully:

```
mount -a
```

NOTE: 11. To repair specific logical volumes, it may be necessary to run the following command:

```
newfs -F vxfs /dev/vg01/rlvol#
mount -a
```

Replace the contents from the other site's LDAD server, and rerun the necessary site localization.

20. If vg01 is not available, the disk needs to be replaced. Follow the instructions in Section II, Part B, *Secondary Disk (vg01) Restoration Procedure*. If vg01 is available, edit the system files to allow the LDAD server to come up to level 3 with the correct identify after reboot.

    a. Edit the `inittab` file as shown below. This restores LDAD to level 3 and the correct identity when the LDAD server is rebooted. Type:

       `vi /etc/inittab`

       Change this line:

       ```
       init:1:initdefault:
       ```

       to:

       ```
       init:3:initdefault:
       ```

    b. Reboot the LDAD server by typing:

       `/etc/reboot`

21. Restart the LDAD process from the ds1 by logging in as `root` and typing:

    ```
    su - ldad
    stopLDAD.sh
    start.LDAD.csh
    exit            (leave ldad user session)
    ```

This completes the primary disk (vg00) restoration procedure.

B. Secondary Disk (vg01) Restoration Procedure

This procedure provides instructions on recreating vg01 on the LDAD's secondary disk. This part of the procedure assumes a volume group 1 existed on the removed secondary disk and the replaced drive is a 4 GB disk.

1. Call the NCF to request the vg01 restoration script be copied to the `/tmp` directory as `ncfuser` from as1-ncf (replace <*`site ID`*> with local site ID):

   `rcp /home/maintenance/scripts/ls.vg01 ds-<site ID>:/tmp`

2. At a workstation, open a terminal window, log in to ds1 as `root`, and copy the restoration script to the LDAD server by typing:

   `rcp /tmp/ls.vg01 ls1:/usr/local`

NOTE: If a previous LDAD secondary drive backup does not exist, restore vg01's partitions using another site's backup. If a backup of the vg01 logical volumes does not exist, have the site use the procedures in section I, part A, step 10 and section I, part B, step 1.

3. Edit the inittab file so that when the LDAD server is rebooted, it will only come up to level 1. This will keep the LDAD processes from writing to the mount points. This may already have been done if also recovering the root disk. Skip to the next step if this file has already been modified and the LDAD server is running in single user mode. Type:

   `vi /etc/inittab`

   Change this line:

   init:3:initdefault:

   to:

   `init:1:initdefault:`

   Type: **`/etc/reboot`**

4. After the disk has been replaced and the LDAD server has been rebooted, login to the LDAD server and perform the ls.vg01 script as root. Make sure before starting the vg01 script that vg01 is not active by entering the following:

   Type: **bdf**
   Result: Only vg00 entries should be displayed (as in the example below).

```
/dev/vg00/lvol3     102400   20730   76586   21% /
/dev/vg00/lvol1      47829   18211   24835   42% /stand
/dev/vg00/lvol6     307200  205628   95518   68% /var
/dev/vg00/lvol5     512000  326933  173556   65% /usr
/dev/vg00/lvol7     512000   73385  411241   15% /usr/local
/dev/vg00/lvol8     716800  377569  318062   54% /opt
/dev/vg00/lvol9     122880   85233   35304   71% /ldad
/dev/vg00/lvol4      99669      70   89632    0% /tmp
```

   Type: **swapinfo**
   Result: Nothing from `/dev/vg01` should be displayed (refer to the example below).

```
             Kb      Kb      Kb  PCT START/      Kb
TYPE      AVAIL    USED    FREE USED  LIMIT RESERVE PRI  NAME
dev      393216       0  393216   0%      0       -   1  /dev/vg00/lvol2
reserve       - 137040 -137040
```

   Clean up the mount points. You must only do this if vg01 is **NOT** mounted:

   Type: **rm -rf /home/* /data/logs/* /data/ldad/* /data/Incoming/***
   Type: **/usr/local/ls.vg01**

   Type **bdf** to verify that vg01 exists. Call the NCF if errors are encountered.

5. Place the vg01 tape into the DAT drive, and restore the secondary drive by typing:

   nohup tar x > /tmp/nohup.out 2>&1 &

   a. Monitor the `tar` process:

```
while true
do
ps -ef|grep "tar x"
date
sleep 10
done
```

   b. Verify the `nohup.out` log file does not display read/write errors by typing:

   cat /tmp/nohup.out

6. The LDAD server needs to have its processes restarted.

   a. Edit the `inittab` file as shown below. This restores LDAD to level 3 and the correct identity when the LDAD server is rebooted. Type:

      `vi /etc/inittab`

      Change this line:

      `init:1:initdefault:`

      to:

      `init:3:initdefault:`

   b. Reboot the LDAD server by typing:

      `/etc/reboot`

7. Restart the LDAD process from the ds1 by logging in as `root` and typing:

   ```
   su - ldad
   stopLDAD.sh
   start.LDAD.csh
   exit            (leave ldad user session)
   ```

This completes the secondary disk (vg01) recovery procedure.

REPORTING MAINTENANCE

Report this preventive maintenance action using the Engineering Management Reporting System (EMRS) according to the instructions in NWSI 30-2104, Maintenance Documentation, Part 4, and Appendix F.

Signature Not Verified

Mark S. Paese

Digitally signed by Mark S. Paese
DN: cn=Mark S. Paese, o=DOC/NOAA/NWS, c=US
Date: 2003.07.28 07:22:47 -04'00'

Mark S. Paese
Director, Maintenance, Logistics, and Acquisition Division